Aluminium wire - Aluminium alloys wire

Following Regulation (EU) No. 453/2010 of the Commission on May 20 2010 *GHS compliant*

1. IDENTIFICATION OF THE PRODUCT AND THE MANUFACTURER

1.1.- Identification of the product:

Aluminium wire.- Aluminium alloys wire.

1.2.- Usage of the product:

Mechanical, electrical, chemical, welding and metallization applications

1.3.- Identification of the manufacturer:

MANUFACTURAS IRULAR S.A.
Ctra. Estella S/N
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Email contact: *calidad1@manfisa.com*

1.4.- Emergency phone number: *+34 948 500206*
(Schedule 8.00-17.00 h Monday to Friday)

2. HAZARD IDENTIFICATION

Aluminium and aluminium alloys in the delivered forms are not dangerous for human purposes or for the environment. However, they may produce some hazards during its usage:

- **Handling of aluminium in its different delivery forms**: Risk of injuries or cuts because of cutting or sharp edges. Risks produced by handling weights. Risk of skin irritation due to the contact with lubricant oil residues of the product.
- **Liquid or hot metal**: Risk of burning.
- **Processes with liquid aluminium**: Risk of projection, explosions and fire when the aluminium gets in contact with water or metal oxides.
- **Generating processes of:**
  - **Suspended Aluminium powder**: (milling, cutting, rectified...): Risk of explosion, fire and projection. Risk of injuries in the eyes. Risk of irritation in the eyes, skin and upper breathing system Risk of cancer in the upper breathing system.
  - **Powder and Aluminium shavings in humid atmosphere or in contact with metal oxides**: Risk of explosion, fire and projections besides all the previous aspects.
- **Electric processes**: Electric risk: aluminium is a conductive metal of electricity.
- **Chemical and electrochemical processes that liberates Hydrogen**: Risk of fire and explosion.
- **Alumina generating processes**: It shows a low risk for health due to inhalation and must be treated as common harmful powder.

- **Ozone generating processes** (welding, plasma arc cutting, metalizing with plasma arc, can produce ozone).
  - It may produce irritation in the eyes, nose and upper breath system.
  - Acute overexposures can produce lack of breath, tension in the chest, headache, caught, nauseas and narrowness of breathing tracks. The effects are reversible if the exposure stops. Acute overexposures (high concentrations) can cause breath troubles, diseases in the breath system, bleeding, lung fluids (lung oedema). The effects can appear after 1-2 hours.
    Additional information: Studies (inhalation) with laboratory animals have found genetic and reproductive diseases, harms in red globules of blood, lung diseases and death.
- **Nitrogen oxides generating processes**: cutting processes of the aluminium using plasma arc may produce nitrogen oxides (NO and NO_2):
  - This may cause irritation in the eyes, nose and breath system.
  - Acute overexposures may reduce the capacity of blood for transporting the oxygen. It may cause caught, lack of breath, fluids in lungs (lung oedema) and death. The effects may appear after 2-3 weeks. Chronic overexposures to NO_2 may cause scarf in the lungs (pulmonary fibrosis).
- **Vapour/fog of oil generating processes**: It can produce irritation in the breath system. Acute overexposures may produce bronchitis, asthma, headache, effects in central nervous system and sleepiness.
- **Fumes generating processes**: (welding, plasma cutting, metallization, can cause fumes). May cause irritation of the respiratory tract. Acute overexposures can cause bronchitis, asthma, headache, central nervous system effects and drowsiness.
- **Generating processes of non-ionizing radiation** (welding, plasma cutting, metallization, can cause non-ionizing radiation. May cause skin and eyes injuries, may cause skin and eyes chronic effects.

3. COMPOSITION / INFORMATION ABOUT THE COMPONENTS

Basis metal: Aluminium				
Basis Metal	**Nº CAS**	**Nº EINECS**	**Symbol**	**Content (% by weight)**
Aluminium	7429-90-5	231-072-3	Al	> 90%
Elements which could be present in quantities higher than 0.1% by weight				
Element	**Nº CAS**	**Nº EINECS**	**Symbol**	**Content (% by weight)**
Silicon	7440-21-3	231-130-8	Si	≤ 2.20 %
Iron	7439-89-6	231-096-4	Fe	≤ 1.00 %
Copper	7440-50-8	231-159-6	Cu	≤ 6.80 %
Manganese	7439-96-5	231-105-1	Mn	≤ 1.8 %
Magnesium	7439-95-4	231-104-6	Mg	≤ 6.00 %
Chromium	7440-47-3	231-157-5	Cr	≤ 0.35 %
Nickel	7440-02-0	231-111-4	Ni	≤ 1.40 %
Zinc	7440-66-6	231-175-3	Zn	≤ 0.90 %
Titanium	7440-32-6	231-142-3	Ti	≤ 0.20 %

Remark: The impurities and alloying elements of the products are established by the EN-573-3 standard. To know the content of each particular batch, consult the Analysis Certificate of the product.

4. FIRST AIDS

INHALATION (powder, fumes/smoke, etc.): Remove the patient to a ventilated room, fresh air, keep him/her relaxed and ask for medical aid if the symptoms persist. If necessary, use artificial breath. Ask a doctor.

EYE CONTACT (fumes/smoke, powder, particles, etc.): In case of irritation, flush with plenty of water with a salty solution with the eyes opened. In case of prolonged irritation ask a doctor.

EYE CONTACT (sticks, wire or solid products): Ask a doctor.

INGESTION: do not provoke the vomit. Ask a doctor.

BURNS: In case of minor burns flush with plenty of cold water and put on cream. If the burns are serious, ask for medical assistance.

5. FIRE FIGHTING MEASURES

5.1.- PRECAUTIONS TO TAKE:

- The product has no danger of fire or exploding in the way it is delivered.
- Aluminium with adhered humidity may produce projection and in some cases explosions when fused or dunked into a liquid metal projection and in some cases explosions. Contact between liquid aluminium and metal oxides (iron oxides e.g.) or other oxygen forms may produce, in the same way, projections and explosions in certain cases. As a result, it is necessary to take the right measures:
    - Ingots storage for the fusion oven loads in a dry place.
    - Preheat the ingots before loading the oven.
    - Cleaning and preheating of all products, tools and recipients that could be in contact with the liquid metal. Preheating the additive products and the products for metallurgic treatments.

- The suspended aluminium powder may be explosive, specially in closed atmospheres.
- Avoid sparks and accumulations of electrostatic charges. Do not smoke.
- Remove thin particles of Aluminium generated by actions in the transformation of metal finishes (mechanizing, shot processes, etc.) by an adapted extractor.
- Avoid contact with water and with the humidity of air.
- Aluminium divided into fine particles may form Hydrogen in contact with the humidity of air. This has an explosion risk. As a result, the uncontrolled accumulation of Aluminium divided into fine particles in a permanently non ventilated room must be avoided.

5.2.- APPROPRIEATE EXTINGUISHING METHODS

- **For fires involving powder and Aluminium shavings or eventually liquid Aluminium**: only alumina, magnesium or dry sand should be used to contain and weaken the fire. Put it slowly over the fire.
- **For fire of powder or shavings**: Class D extinguishers, specially developed for metal fires, must be used.
- For fires of Aluminium powder, avoid producing a cloud of particles in the process of extinguishing it.
- A fire of Aluminium powder may resist long time after using the extinguisher powder, so it is necessary to avoid the spreading of the fire.

5.3.- INCORRECT EXTINGUISHING METHODS:

- USE EXTINGUISHER CLASS **D**, SPECIFYING "METAL FIRE".
- DO NOT USE WATER.
- DO NOT USE HALOGENATED EXTINGUISHERS OVER SMALL PARTICLES OR PIECES.

5.4.- PARTICULAR RISKS RESULTING OF THE EXPOSURE

Aluminium powder and aluminium smoke present small risks by inhalation in short exposures. They are neither irritating for the eyes, nor for the skin and they don't have toxic effects by ingestion in short exposures.

5.5.- SPECIAL EQUIPMENT FOR FIREMEN

If necessary, firemen will use breath self contained systems of positive pressure and total protective clothes.

6. ACCIDENTAL RELEASE MEASURES

The product in the delivered forms does not have any risk of release. It only exists risk in case of smelting of aluminium.

PERSONAL PRECAUTIONS

Avoid the contact wit liquid metal. Avoid breathing the steam/vapour, fog and smoke/fumes.

PRECAUTIONS FOR PROTECTING THE ENVIRONMENT

Avoid filtrations of liquid aluminium.
Avoid the spread of aluminium powder and shavings in the air.

CLEANING METHODS

Liquid Aluminium: leave it solidify before recuperating the material.
Powder and shavings: avoid producing clouds when sweeping or vacuuming.

7. HANDLING AND STORAGE

7.1.- HANDLING:

- **Risk of falling of the product while handling**: use security boots.
- **Ergonomic risks and over-efforts while manipulating weights**: take the right measures.
- **Risk of cut**: All the products may present sharp edges or angels with the consequent risk of accidental cut. Using gloves when handling the products is recommended.
- **Products with hoops**: Risk of cut with the hoops. Pay attention to the spring effect. Use adequate gloves and glasses.
- **Risk of trapping when rolling the cylindrical products:** Immobilise them. Pay special attention unwrapping.
- **Risk of burning**: hot aluminium shows no colour difference in relation to the cold metal. Use the right measures to avoid accidents produced by hot metal.

Use the aid of mechanic means whenever it is possible during handling the product.

7.2.- STORAGE

- Avoid the accumulation of humidity over the products that will be re-melted for avoiding the risk of explosion.
- Powder and granules must be stored in a dry place, with dry floor and without humidity, heat or static electricity.
- Product with a cylindrical shape that can roll must be correctly immobilised.
- Keep packing in good conditions.
- Particular instructions about stacking will be taken by final user.

8. EXPOSURE CONTROLS / INDIVIDUAL PROTECTION

8.1.- LIMIT VALUES FOR PROFESSIONAL EXPOSURE

CHEMICAL AGENT	CAS No.	TLV – TWA ppm - mg/m3	TLV – STEL ppm - mg/m3	H PHRASES
Metal Aluminium	7429-90-5	-	-	
Aluminium: Powder metal	7429-90-5	10mg/m3	-	261-228 Al stabilized powder
Aluminium: Alkyls as Al		2mg/m3	-	
Aluminium: Welding fumes as Al		5mg/m3	-	
Aluminium Aluminothermy powders, as Al		5mg/m3	-	
Aluminium: Soluble salts as Al.		2mg/m3	-	
Aluminium Oxide	1344-28-1	10mg/m3	-	

CHEMICAL AGENT	CAS No.	TLV – TWA ppm - mg/m3	TLV – STEL ppm - mg/m3	H PHRASES
Silicon	7440-21-3	-	-	
Metal Iron	7439-89-6	-	-	
Iron oxide (III) (powder and fumes), as Fe	1309-37-1	5mg/m3	-	
Metal Copper	7440-50-8	-	-	
Copper: fumes as Cu	7440-50-8	0.2mg/m3	-	
Copper: powder and fog as Cu		1mg/m3	-	
Metal Manganese	7439-96-5		-	
Elemental Manganese	7439-96-5	0.2mg/m3	-	
Inorganic compounds of Manganese, as Mn		0.2mg/m3	-	
Metal Magnesium	7439-96-5	-	-	
Mg Oxide (powder and fumes)	1309-48-4	10mg/m3	-	
Metal Chromium	7440-47-3	2mg/m3 (VLI)	-	
Metal Nickel	7440-02-0	1mg/m3	-	351-372-317
Nickel, inorganic compounds other than those expressly stated. Insoluble compounds such as Ni		0.2mg/m3	-	
Nickel, inorganic compounds other than those expressly stated. Soluble compounds such as Ni		0.1mg/m3	-	
Metal Zinc	7440-66-6	-	-	
Breathable fraction of zinc oxide (2011)	1314-13-2	2mg/m3	10mg/m3	400-410
Metal Titanium	7440-32-6	-	-	
Ozone	10028-15-6	0.1mg/m3 hard work 0.16mg/m3 moderate 0.2mg/m3 light 0.4mg/m3 <= 2h	- - - -	
Dioxide of Nitrogen	10102-44-0	5.7mg/m3	9.6mg/m3	270-330-314
Monoxide of Nitrogen	10102-43-9	31mg/m3	-	
Fog of mineral oil		5mg/m3	10mg/m3	
Hydrogen	1333-74-0	Simple asphyxiant		

8.2.- EXPOSURE CONTROLS.- Professional controls of exposure.

8.2.1.- Professional controls of exposure:

- **Respiratory protection**: Special ventilation may be necessary to evacuate the fine particles and smoke generated by the different operations performed of transformation, smelting or welding. If there were risk of the over-passing the allowed limits, always use the adequate respiratory protection (facemasks with P2 filters).

- **Safety clothes and skin protection**: Handling of liquid metal requires the compulsory usage of clothes resistant to fire, leggings or similar equipment, gloves and eye protection.

- **Hand protection**: Use protective gloves in the following situations:
  -Any handling of liquid or hot metal, shavings and powder.
  -Any handling of wire that could have cutting edges or sharp edges.
  -Any handling of the product with residual oil.
  -Any handling of metal hoops of the packages.

- **Eye protection**: Use glasses, piks, etc. in the following situations:
  - Next to liquid metal and/or handling it.
  - Working with aluminium powder and generating processes of shaving, fine particles, etc.
  - Fumes/smoke generating processes of smelting or welding.
  - Handling hoops

- **Welding particular case:** Appropriate respiratory and eye protection in welding works: Welding of Aluminium may produce smoke, ozone, oxides and ultraviolet rays. Long exposures may produce nauseas, headache and sometimes lung diseases.
  Appropriate protection measures for the respiratory system and eyes should be taken.

- **Medical follow up for people exposed:**
  It doesn't exist any standard specific medical treatment in case of exposure to aluminium. Only Germany has fixed a biological urinary index of 0.2 mg/l.

8.2.2.- Environmental control of exposure:

Smoke fumes and gases emissions: if they overpass the standard limits, the mentioned smoke should be treated with the appropriate processes.

Keep aluminium powder and shavings away from wind.

Packaging has to be correctly managed by the last user.

9. BASIC CHEMICAL AND PHYSICAL PROPERTIES

Appearance	Solid, silvery colour with metallic brightness
Odor / Aroma threshold	Odorless
pH	Not applicable
Melting point / Freezing point	450 – 700ºC depending of the alloy
Initial Boiling point and boiling range	Around 2300 ºC
Flammability limit	Not applicable
Evaporation rate	No applicable
Flammability / upper and lower limits of flammability and explosiveness	Not applicable
Vapour pressure / Vapour density	Not applicable
Density	2.5 – 2.9 Kg/dm^3
Solubility	Not soluble
Partition coefficient n-octanol/water	Not applicable
Autoignition temperature / Descomposition temperature	Not applicable

10. STABILITY AND REACTIVITY

10.1.-CHEMICAL REACTIVITY AND STABILITY

Aluminium in the delivered forms, is stable and it is not reactive in normal conditions of using, storage and transport. However, it could cause hazards in some ways of using.

Small pieces, particles, powder and melted metal are considerably more reactive with the following substances:

- **Water**: It slowly produces gaseous hydrogen that is flammable/explosive, and heat. The speed of producing hydrogen increases with smaller particles. Melted metal may react explosive/violently in contact with water or humid surfaces.
- **Heat:** It oxydizes at certain speed, which depends on the temperature and the size of particles.
- **Hard oxides:** violent reaction generating heat (ammonium nitrate, fertilizers containing nitrates…)
- **Acids and alkalis**: Aluminium reacts generating flammable/explosive hydrogen.
- **Halogenates Compounds**: it could react violently.
- **Oxides:** could produce a violent thermo reaction.
- **Iron powder and water**: explosive reaction producing hydrogen when it is heated over 800ºC.

Aluminium may react in contact with basic strong products like degreasers.

Melted aluminium could react violently in contact with nitrates and oxides of some metals.

10.2.- CONDITIONS TO BE AVOIDED

Avoid melting humid or cold products, because they can produce explosions in contact with water or humid surfaces.

In places with high concentration of powder, it may produce an explosive atmosphere.

10.3.- DANGEROUS PRODUCTS OF DECOMPOSITION

Dangerous products of decomposition: Not known.

Additional data: Non corrosive

11. TOXICOLOGICAL INFORMATION

The effects on health related to the components are:

Aluminium dust, chips and fumes: Low health risk by inhalation. It is generally considered biologically inert (milling, cutting, grinding)

Silicon inert powder: Chronic overexposure can cause chronic bronchitis and narrowing of the airways.

Manganese dust and fumes: Chronic overexposures can cause inflammation of lung tissue, scarring of the lungs (pulmonary fibrosis), central nervous system damage, Secondary Parkinson and reproductive damage in men

Copper dusts and mists: Can cause irritation of eyes, mucous membranes, skin and respiratory tract. Chronic overexposure can cause decreased red blood cells (anemia), skin abnormalities (pigmentation changes) and hair discoloration

Chromium dust and fumes: Can cause irritation of eyes, mucous membranes, skin and respiratory tract. Metallic Chrome is not classified as carcinogenic to humans.

Nickel dust and fumes: Can cause irritation of eyes, mucous membranes, skin and respiratory tract. Eye contact may cause eye inflammation and conjunctivitis. Contact with skin may cause sensitization and allergic contact dermatitis. Chronic overexposure may cause perforation of the nasal septum, inflammation of the nasal passages (sinusitis), respiratory sensitization, asthma and lung scarring (pulmonary fibrosis). Suspected of causing cancer

Residual oil: The products supplied have residual oil in the production process. This oil can cause skin irritation. For prolonged or repeated contact may cause dermatitis.

12. ECOLOGICAL INFORMATION

Alloying elements and impurities are not usually freed.

12.1.- TOXICITY

Freshwater Algae Data

Copper (7440-50-8) 72 Hr EC50 Scenedesmus subspicatus: 120 µg/L

Nickel (7440-02-0) 72 Hr EC50 freshwater algae (4 species): 0.1 mg/L; 72 Hr EC50 Selenastrumcapricornutum: 0.18 mg/L

Zinc (7440-66-6) 96 Hr EC50 Selenastrum capricornutum: 30 µg/L

Freshwater Fish Species Data

Copper (7440-50-8) 96 Hr LC50 Pimephales promelas: 0.0068-0.0156 mg/L; 96 Hr LC50 Pimephales promelas:<0.3 mg/L [static]; 96 Hr LC50 Pimephales promelas:~0.2 mg/L [flow-through]; 96 Hr LC50 Oncorhynchus mykiss:0.052 mg/L [flow-through]; 96 Hr LC50 Lepomis macrochirus:1.25 mg/L [static]; 96 Hr LC50 Cyprinus carpio:0.3 mg/L [semi-static]; 96 Hr LC50 Cyprinus carpio:0.8 mg/L [static]; 96 Hr LC50 Poecilia reticulata:0.112 mg/L [flow-through]

Iron (7439-89-6) 96 Hr LC50 Morone saxatilis: 13.6 mg/L [static]; 96 Hr LC50 Cyprinus carpio:0.56 mg/L [semi-static]

Niquel (7440-02-0) 96 Hr LC50 Brachydanio rerio: >100 mg/L; 96 Hr LC50 Cyprinus carpio:1.3 mg/L [semi-static]; 96 Hr LC50 Cyprinus carpio:10.4 mg/L [static]

Zinc (7440-66-6) 96 Hr LC50 Pimephales promelas: 2.16-3.05 mg/L [flow-through]; 96 Hr LC50 Pimephalespromelas:0.211-0.269 mg/L [semi-static]; 96 Hr LC50 Pimephales promelas:2.66 mg/L [static]; 96 Hr LC50 Cyprinus carpio:30 mg/L; 96 Hr LC50 Cyprinus carpio:0.45 mg/L [semi-static]; 96 Hr LC50 Cyprinus carpio:7.8 mg/L [static]; 96 Hr LC50 Lepomis macrochirus:3.5 mg/L [static]; 96 Hr LC50 Oncorhynchus mykiss:0.24 mg/L [flow-through]; 96 Hr LC50 Oncorhynchus mykiss:0.59 mg/L [semi-static]; 96 Hr LC50 Oncorhynchus mykiss:0.

Water Flea Data

Cobre (7440-50-8): 96 Hr EC50 Water Flea: 10 µg/L; 96 Hr EC50 Water Flea: 200 µg/L

Niquel (7440-02-0) 96 Hr EC50 Water Flea: 510 µg/L

Zinc (7440-66-6) 72 Hr EC50 Water Flea: 5 µg/L

12.2.- MOBILITY

Aluminium is not movable in the environment in normal environmental conditions, except in an aqueous medium of ph < 5.5 or > 8.5. Avoid filtrations of liquid aluminium and spread of powder and shavings.

13. CONSIDERATIONS FOR ITS ELIMINATION

Whenever it is possible, it will be reused or recycled.
If it is not possible, the residues generated in the different processes of manufacturing will be eliminated following the current legislation.

14. INFORMATION ABOUT TRANSPORT

International Regulations

The products covered by this document are not subject to national and international regulations on the transport of dangerous goods:

- Transport by truck: Not subject to ADR/RID-RTMDR/RTMDF or GGVS
- Transport by ship: Not subject to IMO or IMDG
- Transport by air: Not subject to ICAO/TI-IATA/DGR

Risks relating to transport:

- Derived from handling: See point 7.
- Derived of an incorrect adjustment of the load within the transport, such as road traffic accidents and accidents to download the material..

The loading and unloading operations have to be done protected from rain and snow.

15. REGULATORY INFORMATION

Aluminum and aluminum alloys are not considered as dangerous substances, and are not subject to classification, packaging and labeling of dangerous substances Regulation

Aluminium and aluminum alloys is not affected by the directive 90/394/EECC 28.06.1990 (protection against carcinogens)

Aluminum and its components (impurities and alloying elements) are included in the European Inventory of New and Existing Chemicals (EINECS)

16. OTHER INFORMATIONS

The information provides by this security datasheet is based on current knowledge and experiences related to the mentioned products. Its target is the description of the product from the point of view of risk prevention and environmental protection.
This information does not guarantee in any case the specific properties of the product. The information is provided without any guarantee (express or implicit).
This file does not exempt from responsibility to the final user about the precautions to be kept during its particular activity. This file complements the usage information, but it does not replace them at any case. It would be his only responsibility to take the precautions related to its usage.

Should you need any further information, please consult Manufacturas Irular.

The content of this file is confidential.